

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

K0208-013

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5)

09/647279

INTERNATIONAL APPLICATION NO.

PCT/JP99/01542

INTERNATIONAL FILING DATE

March 26, 1999

PRIORITY DATE CLAIMED

March 27, 1998

TITLE OF INVENTION

PLASTIC SYRINGE BARREL AND METHOD FOR IMPROVING THE SAME

APPLICANT(S) FOR DO/EO/US

Kazumi IJIMA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made, however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

a. References cited in International Search Report

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5) 09/647279	INTERNATIONAL APPLICATION NO. PCT/JP99/01542	ATTORNEY'S DOCKET NUMBER K0208-013
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21. The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

- ☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **\$970.00**
- ☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **\$840.00**
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$690.00**
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **\$670.00**
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **\$96.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =**\$840.00**

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

\$0.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	9 - 20 =	0	x \$18.00	\$0.00
Independent claims	2 - 3 =	0	x \$78.00	\$0.00
Multiple Dependent Claims (check if applicable) <input checked="" type="checkbox"/>				\$260.00

TOTAL OF ABOVE CALCULATIONS =**\$1,100.00**

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☐

\$0.00**SUBTOTAL =****\$1,100.00**

Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).

\$0.00**TOTAL NATIONAL FEE =****\$1,100.00**

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐

\$0.00**TOTAL FEES ENCLOSED =****\$1,100.00**

Amount to be refunded	\$
charged	\$

- ☐ A check in the amount of _____ to cover the above fees is enclosed.
- ☒ Please charge my Deposit Account No. **16-0633** in the amount of **\$1,100.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **16-0633** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

John M. DiMatteo, Esq.
Patterson, Belknap, Webb & Tyler
1133 Avenue of the Americas
New York, New York 10036-6710

SIGNATURE

John M. DiMatteo

NAME

Reg. No. 32,690

REGISTRATION NUMBER

9/26/00

DATE

DESCRIPTION

PLASTIC SYRINGE BARREL AND METHOD FOR IMPROVING THE
SAME

Technical Field

The present invention relates to a plastic syringe barrel and a method for improving the same.

Background Art

A pre-filled plastic syringe, that is, a plastic syringe with relatively large content volume into which a contrast medium is previously injected has been used in recent years. Since the contrast medium has relatively high viscosity, resistance is large in injecting the contrast medium into the body through blood vessels, the spiral cord, and the like. Hence, pressure injection by using a machine is generally performed. In this case, an extension tube or the like is connected to a nozzle portion of the plastic syringe barrel, and the contrast medium is injected under pressure into the body through the extension tube or the like, blood vessels, the spiral cord, and the like. When the contrast medium is injected into the body as described above, high pressure is applied to the inside of the plastic syringe, thereby creating a possibility that the connection portion of the of the plastic syringe barrel and the extension tube or the like becomes disconnected, and thus a luer lock portion for enabling firm connection to the extension tube or the like is formed in the nozzle portion of the plastic syringe barrel. This luer lock portion usually has structure in which a cylindrical space is formed between

an inner peripheral surface of an outer cylinder and an outer peripheral surface of an inner cylinder. The extension tube or the like is connected to the nozzle portion of the plastic syringe barrel by screwing a forward end of the extension tube or the like into the luer lock portion thus formed in the cylindrical space.

In this case, however, the connection of these two sometimes becomes loose due to the withdrawal of the screwed extension tube or the like. If injection is performed in loose connection, there is a possibility of the contrast medium leaking out of the connection portion due to high pressure applied during the injection of the contrast medium, which causes a problem.

An object of the present invention is to provide a means capable of firmly and surely connecting the extension tube or the like to the nozzle portion of the plastic syringe barrel and avoiding looseness of the connection.

Disclosure of the Invention

Claim 1 is characterized in that in a plastic syringe barrel in which an outer cylinder and an inner cylinder are formed in a nozzle portion of the plastic syringe barrel and in which a luer lock portion composed of a cylindrical space is formed between an inner peripheral surface of the outer cylinder and an outer peripheral surface of the inner cylinder, all or part of an inner surface of the luer lock portion is subjected to surface roughening treatment.

In the plastic syringe barrel in claim 1, as described in claim 2, the inner peripheral surface of the outer cylinder may be subjected to surface roughening treatment. Further, as described in claim 3, a helically continuous screw thread is formed on the inner peripheral surface of the outer cylinder,

and the surface of the screw thread and/or a screw root portion may be subjected to surface roughening treatment. Furthermore, as described in claim 4, the material of the plastic syringe barrel is cyclic polyolefin resin. Moreover, as described in claim 5, the surface roughening treatment is performed, for example, by blast treatment.

Claim 6 is characterized in that in a method for improving a plastic syringe barrel in which an outer cylinder and an inner cylinder are formed in a nozzle portion and in which a luer lock portion composed of a cylindrical space is formed between an inner peripheral surface of the outer cylinder and an outer peripheral surface of the inner cylinder, the connection strength of the luer lock portion is enhanced by forming all or part of an inner surface of the luer lock portion into a surface subjected to surface roughening treatment.

An extension tube or the like having a helical groove is screwed into the luer lock portion and connected thereto. What is connected to the luer lock is not limited to the extension tube, and may be a needle, a three-way cock, or the like. Also, its material is not specially limited.

In the plastic syringe barrel in claims 1 to 5, "subjected to surface roughening treatment" is not limited to a case where the inner surface of the luer lock portion is directly subjected to surface roughening treatment by subjecting all or part of the inner surface of the luer lock portion to blast treatment or the like. It also includes, for example, a case where in a mold used when the plastic syringe barrel is resin-molded, for example, a mold surface of a portion facing the inner surface of the luer lock portion is formed into a roughened surface and where the inner surface of the luer lock portion is indirectly subjected to surface roughening treatment by transferring the shape of the roughened surface of the mold surface to the inner surface of the

luer lock portion at the time of resin molding.

The blast treatment involves blowing hard fine particles such as emery onto the inner surface of the luer lock portion or the mold surface under high pressure to form small protruding and recessed portions thereon, thereby roughening the surface. In this invention, surface roughening treatment is performed by leaving small scratches on all or part of the inner face of the luer lock portion by forming a mold surface of a portion facing the inner surface of the luer lock portion into a roughened surface by being subjected to blast treatment or the like and transferring the shape of the roughened surface of the mold surface to the inner surface of the luer lock portion at the time of resin molding in a mold used when the plastic syringe barrel is resin-molded, or by directly subjecting the inner surface of the luer lock portion to blast treatment or the like. The aforesaid method of subjecting the inner surface of the luer lock portion or the mold surface to surface roughening treatment is not limited to blast treatment, and surface roughening treatment may be performed by forming small scratches on the inner surface of the luer lock portion or the mold surface by the use of a file or the like.

The material of the plastic syringe barrel is, for example, cyclic polyolefin resin, and polycarbonate resin, polymethacrylate resin, polypropylene resin, and the like are also available. The cyclic polyolefin resin is excellent particularly in the effect of being able to firmly and surely connecting the extension tube or the like.

Brief Description of Drawings

FIG. 1 is an explanatory view of a nozzle portion of a plastic syringe

barrel; and

FIG. 2 is an enlarged view showing the structure of a luer lock portion, and the lower half portion of FIG. 2 (a portion lower than a central line shown by an alternate long and short dash line) shows a section.

5

Best Mode for Carrying out the Invention

A preferred embodiment of the present invention will be explained below with reference to the attached drawings.

As shown in FIG. 1 and FIG. 2, a nozzle portion 2 is provided at a forward end of a plastic syringe barrel 1. The material of the plastic syringe barrel 1 is, for example, cyclic polyolefin resin. In the nozzle portion 2, an outer cylinder 3 and an inner cylinder 4 are formed; and a liquid such as a contrast medium is filled into the plastic syringe barrel 1. The liquid such as the contrast medium can be injected into the body from within the plastic syringe barrel 1 through a through-hole 5 formed so as to pierce through the middle of the inner cylinder 4.

A luer lock portion 6 composed of a cylindrical space is formed between an inner peripheral surface of the outer cylinder 3 and an outer peripheral surface of the inner cylinder 4. A helically continuous screw thread 7 is formed on the inner peripheral surface of the outer cylinder 3, and a screw root portion 8 is formed in the gap between adjacent ridges of the screw thread 7.

Surface roughening treatment is performed for an inner surface of the luer lock portion 6. The surface roughening treatment is performed by subjecting a mold surface of a portion facing the inner surface of the luer lock portion 6 to blast treatment and transferring the shape of a roughened surface

of the mold surface to the inner surface of the luer lock portion 6 at the time of resin molding, for example, in a mold used when the plastic syringe barrel 1 is resin-molded, or by directly subjecting the inner surface of the luer lock portion 6 to blast treatment. The surface roughening treatment may be performed for all of the inner surface of the luer lock portion 6, or may be performed for only part of the inner surface of the luer lock portion 6. For example, in the inner surface of the luer lock portion 6, only the inner peripheral surface of the outer cylinder 3 may be subjected to the surface roughening treatment. Moreover, for example, in the inner surface of the luer lock portion 6, the surfaces of both the helical screw thread 7 and the screw root portion 8 which are formed on the inner peripheral surface of the outer cylinder 3 may be subjected to the surface roughening treatment. Furthermore, the surface roughening treatment may be performed for only the surface of either one of the helical screw thread 7 or the screw root portion 8 formed on the inner peripheral surface of the outer cylinder 3.

In the nozzle portion 2 at the forward end of the plastic syringe barrel 1 structured as above, for example, by screwing a forward end of an extension tube not illustrated into the luer lock portion 6 composed of the cylindrical space, a helical groove formed in a peripheral surface of the extension tube not illustrated can be brought into engagement with the helical screw thread 7 formed on the inner peripheral surface of the outer cylinder 3, whereby the extension tube or the like can be firmly and surely connected to the nozzle portion 2 of the forward end of the plastic syringe barrel 1.

Industrial Availability

According to the invention in claims 1 to 6, a plastic syringe barrel

and an extension tube or the like can be firmly and surely connected, and the connection does not become loose since friction between them is increased by surface roughening treatment. Consequently, there is no fear of a contrast medium leaking out of a connection portion when the contrast medium is
5 injected into the body from within the plastic syringe barrel through blood vessels, the spinal cord, or the like.

Claims

1. A plastic syringe barrel in which an outer cylinder and an inner cylinder are formed in a nozzle portion of the plastic syringe barrel and in which a luer lock portion composed of a cylindrical space is formed between an inner peripheral surface of the outer cylinder and an outer peripheral surface of the inner cylinder,

wherein all or part of an inner surface of said luer lock portion is subjected to surface roughening treatment.

2. The plastic syringe barrel according to claim 1, wherein said inner peripheral surface of said outer cylinder is subjected to surface roughening treatment.

3. The plastic syringe barrel according to claim 1, wherein a helically continuous screw thread is formed on said inner peripheral surface of said outer cylinder, and the surface of said screw thread and/or a screw root portion is subjected to surface roughening treatment.

4. The plastic syringe barrel according to claim 1, wherein the material of said plastic syringe barrel is cyclic polyolefin resin.

5. The plastic syringe barrel according to any one of claims 1, 2, 3, and 4, wherein said surface roughening treatment is blast treatment.

6. A method for improving a plastic syringe barrel in which an outer cylinder and an inner cylinder are formed in a nozzle portion and in which a luer lock portion composed of a cylindrical space is formed between an inner peripheral surface of the outer cylinder and an outer peripheral surface of the inner cylinder,

wherein the connection strength of said luer lock portion is enhanced by forming all or part of an inner surface of said luer lock portion into a surface subjected to surface roughening treatment.

Abstract

A plastic syringe barrel having a luer lock portion is characterized in that the inside of the luer lock portion is formed into a roughened surface by means of blast treatment, thereby enhancing the connection strength of the luer lock portion.

FIG.1

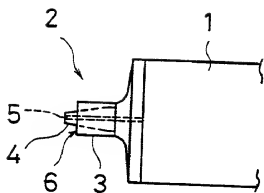
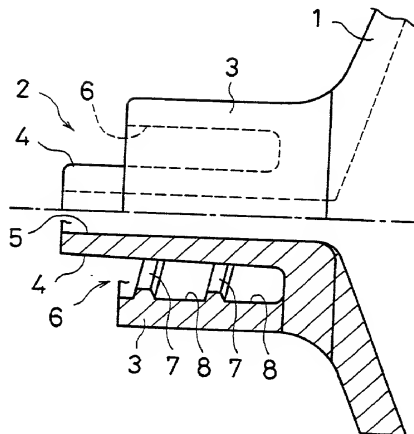


FIG.2



8.03mm

EXPLANATION OF CODES

- 1 PLASTIC SYRINGE BARREL
- 2 NOZZLE PORTION
- 3 OUTER CYLINDER
- 4 INNER CYLINDER
- 5 THROUGH-HOLE
- 6 LUER LOCK PORTION
- 7 SCREW THREAD
- 8 SCREW ROOT PORTION

Please type a plus sign (+) inside this box →

PTO/SB/81 02-01

Approved for use through 10/31/2002. OMB 0651-0025

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POWER OF ATTORNEY OR AUTHORIZATION OF AGENT

Application Number	09/647, 279
Filing Date	September 26, 2000
First Named Inventor	Kazumi Iijima
Title	Plastic Syringe Barrel
Group Art Unit	t.b.a. and Method For
Examiner Name	t.b.a. Improving The Same
Attorney Docket Number	K0208-0013

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☒ Applicant/Inventor

☐ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(a) is enclosed. (Form PTO/SB/96)

SIGNATURE of Applicant or Assignee of Record

Name Kazumi Iijima

Signature

Date

Kazumi Iijima
22/06/2001

**DECLARATION FOR UTILITY OR
 DESIGN
 PATENT APPLICATION
 (37 CFR 1.63)**

☐ Declaration Submitted with Initial Filing
 OR
☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number K0208-0013
 First Named Inventor Kazumi Iijima
COMPLETE IF KNOWN
 Application Number 09/647, 279
 Filing Date September 26, 2000
 Group Art Unit t.b.a.
 Examiner Name t.b.a.

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Plastic Syringe Barrel and
 Method For Improving The Same

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 09/26/2000

as United States Application Number or PCT International

Application Number 09/647, 279 and was amended on (MM/DD/YYYY) (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification including the claims, as amended by any amendment, specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor(s) or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor(s) or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
10/80688	JP	3/27/1998	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PCT/JP99/01542	PCT	3/26/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed in a supplemental priority data sheet PTO/SB/02B attached hereto.

(Page 1 of 2)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name
(first and middle (if any)) Kazumi

Family Name
or Surname Iijima

Inventor's
Signature Kazumi Iijima

Date 22/06/2001

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NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name
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Family Name
or Surname

Inventor's
Signature

Date

Residence: City

State

Country

Citizenship

Mailing Address

City

State

ZIP

Country

☐ Additional inventors are being named on the _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto